

1 Site. These capabilities are needed to protect human health and the environment while enabling us to  
2 clean up Hanford and assist other DOE sites in completing their cleanup programs. Our proposed actions  
3 will allow us to comply with local, State, and federal laws and meet other legal obligations such as the  
4 Hanford Federal Facility Agreement and Consent Order (the Tri-Party Agreement).

5  
6 To address our anticipated needs for waste management capabilities, we propose to

- 7
- 8 • continue to operate our existing treatment, storage, and disposal facilities
- 9
- 10 • develop additional capabilities both to treat MLLW and to certify TRU waste for disposal at the
- 11 Waste Isolation Pilot Plant in New Mexico
- 12
- 13 • construct additional disposal capacity for LLW, MLLW, ILAW, and tank waste treatment plant
- 14 melters
- 15
- 16 • close onsite disposal facilities and provide for post-closure stewardship of disposal sites.
- 17

18 Alternatives for accomplishing DOE's proposed action, along with an analysis of potential  
19 environmental impacts, are detailed in this revised HSW EIS. The No Action Alternative is also  
20 evaluated as required by NEPA. Through this analysis, we will have the foundation to decide whether to  
21 use or modify existing Hanford facilities, build new facilities, or use offsite facilities.

## 22 23 **S.2 Background**

24  
25 The Hanford Site (Figure S.2) was established in 1943 as part of the World War II nuclear weapons  
26 production effort called the Manhattan Project. Through the 1980s, DOE produced plutonium in nine  
27 nuclear reactors along the Columbia River. In 1988, we stopped plutonium production and shifted our  
28 mission to cleanup. Throughout this timeframe radioactive waste management has been an ongoing  
29 component of Hanford Site operations.

### 30 31 **Hanford Cleanup Progress and New Initiatives**

32  
33 The DOE nationwide cleanup program is an immense and complex effort with many technical,  
34 financial, political, and regulatory issues. Hanford is a major part of that program. In the last five years,  
35 DOE nationwide has made substantial progress in systematically defining the scope, schedules, and life-  
36 cycle costs to meet this challenge as well as in creating an environment for further reform of the cleanup  
37 program by accelerating cleanup and risk-reduction actions, improving schedules and cost efficiencies,  
38 and driving all sites toward closure. At Hanford, we have made significant progress in our cleanup  
39 mission. We have

- 40
- 41 • cleaned up over 200 contaminated soil and waste sites
- 42
- 43 • decommissioned over 500 inactive facilities



**Figure S.2.** Hanford Site Location Map

- placed two production reactors into interim safe storage and begun work on the rest
- disposed of about 4 million tons of environmental restoration waste in a permitted facility
- stabilized and moved more than 1,000 metric tons of the 2,100 metric tons of production reactor fuel from the K Basins to storage on the Central Plateau
- shipped nearly 900 metric tons of uranium to an offsite storage facility
- initiated construction of the tank waste treatment plant for treatment of Hanford's tank waste
- continued treatment and disposal of MLLW in permitted facilities
- continued retrieval of TRU waste
- continued stabilization of plutonium material
- continued certification of TRU waste and shipment to the Waste Isolation Pilot Plant
- continued treatment of contaminated groundwater—more than 4 billion liters of groundwater had been treated to remove substantial amounts of chromium, carbon tetrachloride, nitrate, uranium, technetium-99, and strontium-90 contamination

- removed 77,000 kilograms of carbon tetrachloride from the soil by vapor extraction to prevent future groundwater contamination and to reduce worker exposure.

While DOE cleanup actions are progressing across the nation and at Hanford, there has been dissatisfaction with the pace and cost of cleanup. Some felt that cleanup completion was too far in the future, required unrealistic levels of funding, and was slow to reduce near-term risk. To address this concern, DOE initiated actions to reform the cleanup program.

One of those actions was to develop accelerated cleanup plans with the regulators. The *Performance Management Plan for the Accelerated Cleanup of the Hanford Site* (DOE-RL 2002) created six strategic initiatives that we believe can move the completion date of the Hanford cleanup mission from 2070 to 2035, and possibly to 2025. The six initiatives would accelerate 1) River Corridor cleanup, 2) tank waste retrieval, treatment, and closure, 3) nuclear materials stabilization and inventory reduction, 4) waste disposal, 5) Central Plateau cleanup, and 6) groundwater cleanup and protection. We will do this without compromising the quality of the cleanup and in compliance with applicable requirements and cleanup standards.

Each of these initiatives may impact Hanford's Solid Waste Program, but activities included in the strategic initiative to accelerate waste disposal (item 4 above) are most relevant to the alternatives analyzed in this HSW EIS. Specific performance milestones within that initiative include the following:

- complete retrieval, designation, and storage/disposal of 15,000 drum-equivalents of suspect TRU waste by September 2006, 4 years early
- complete treatment and/or disposal of all stored MLLW (about 7000 cubic meters) and newly generated MLLW (forecasted to be about 7000 cubic meters) by September 2008, 4 years early
- complete certification and shipment of all legacy, contact-handled TRU waste (about 7500 cubic meters) to the Waste Isolation Pilot Plant by September 2015, 12 years early
- complete construction and initiate use of lined MLLW/LLW disposal facilities by September 2007.

Some of the acceleration activities described in our performance management plan could be implemented immediately. Others could be implemented following completion of this HSW EIS. Still others may require further planning, changes to existing permits and Tri-Party Agreement Milestones, and preparation of additional environmental analyses.

While our performance management plan targets a cleanup completion date of 2035 or sooner, our technical baseline, which includes the basis for our forecasted waste volumes, has not yet been updated to accommodate all of the acceleration initiatives. In fact, the plan requires this next level of detail to be completed by January 2004. Therefore, in Appendixes B and C of this HSW EIS we have provided our current basis of analysis for the waste volume forecasts. We believe these volumes are conservative. While the acceleration initiatives may impact the timing of actions, the overall waste volumes will likely remain fairly constant.

## Disposition of Waste Across the DOE Complex and at Hanford

Hanford is part of a nationwide complex of DOE sites undergoing cleanup operations and disposing of radioactive waste (Figure S.3). The WM PEIS (DOE 1997a) was a DOE-wide study examining the environmental impacts of managing an estimated 2,000,000 cubic meters of radioactive and hazardous waste from past, present, and reasonably foreseeable DOE activities across the nation. DOE's goal in preparing the WM PEIS was to develop a nationwide strategy to treat, store, and dispose of the waste in a safe, responsible, and efficient manner that minimized the impacts to workers, the public, and the environment. Wastes analyzed in the WM PEIS included MLLW, LLW, TRU waste, HLW, and hazardous waste.

### Waste Management Programmatic EIS

The WM PEIS provides information on the impacts of various alternatives that DOE used to decide at which sites to consolidate or decentralize treatment, storage, and disposal activities for each waste type. However, the specific location of new facilities at selected sites would be based on existing or additional site-specific NEPA reviews.

In the Records of Decision resulting from the final WM PEIS, DOE decided the following:

- Sites with existing disposal capabilities for LLW and MLLW will continue to dispose of their wastes in their onsite facilities. Sites with these capabilities include the Idaho National Engineering and Environmental Laboratory, the Oak Ridge Reservation in Tennessee, the Savannah River Site in South Carolina, the Los Alamos National Laboratory in New Mexico, the Nevada Test Site, and the Hanford Site.
- The Record of Decision for management of LLW and MLLW identified the Hanford Site and the Nevada Test Site as potential disposal facilities for wastes from sites that do not have disposal capability. The Nevada Test Site is expected to take the bulk of the LLW that would be sent offsite from other DOE generators. For example, over the 5-year time period (2002 to 2006) it is estimated that the Nevada Test Site will receive approximately 423,000 cubic meters of LLW. This amount (for just this 5-year period) is more than the entire offsite volume of LLW and MLLW we would receive at Hanford under the Upper Bound waste volume estimate and over 20 times the amount of offsite waste that we would receive using the Lower Bound waste volume estimate.
- For management of TRU waste, each site would prepare and certify waste generated at that site for disposal at the Waste Isolation Pilot Plant in New Mexico. Subsequently, DOE amended this Record of Decision for TRU waste to allow for temporary storage, characterization, and certification of TRU waste from small generator sites at the Savannah River Site and the Hanford Site. The Hanford Site was authorized to receive approximately 170 drums of waste (36 cubic meters) from the Battelle West Jefferson North Site in Ohio and the Energy Technology and Engineering Center in California for treatment, certification, and storage prior to being shipped to the Waste Isolation Pilot Plant for disposal.
- DOE would continue the current practice of managing non-radioactive hazardous waste at commercial treatment and disposal facilities.

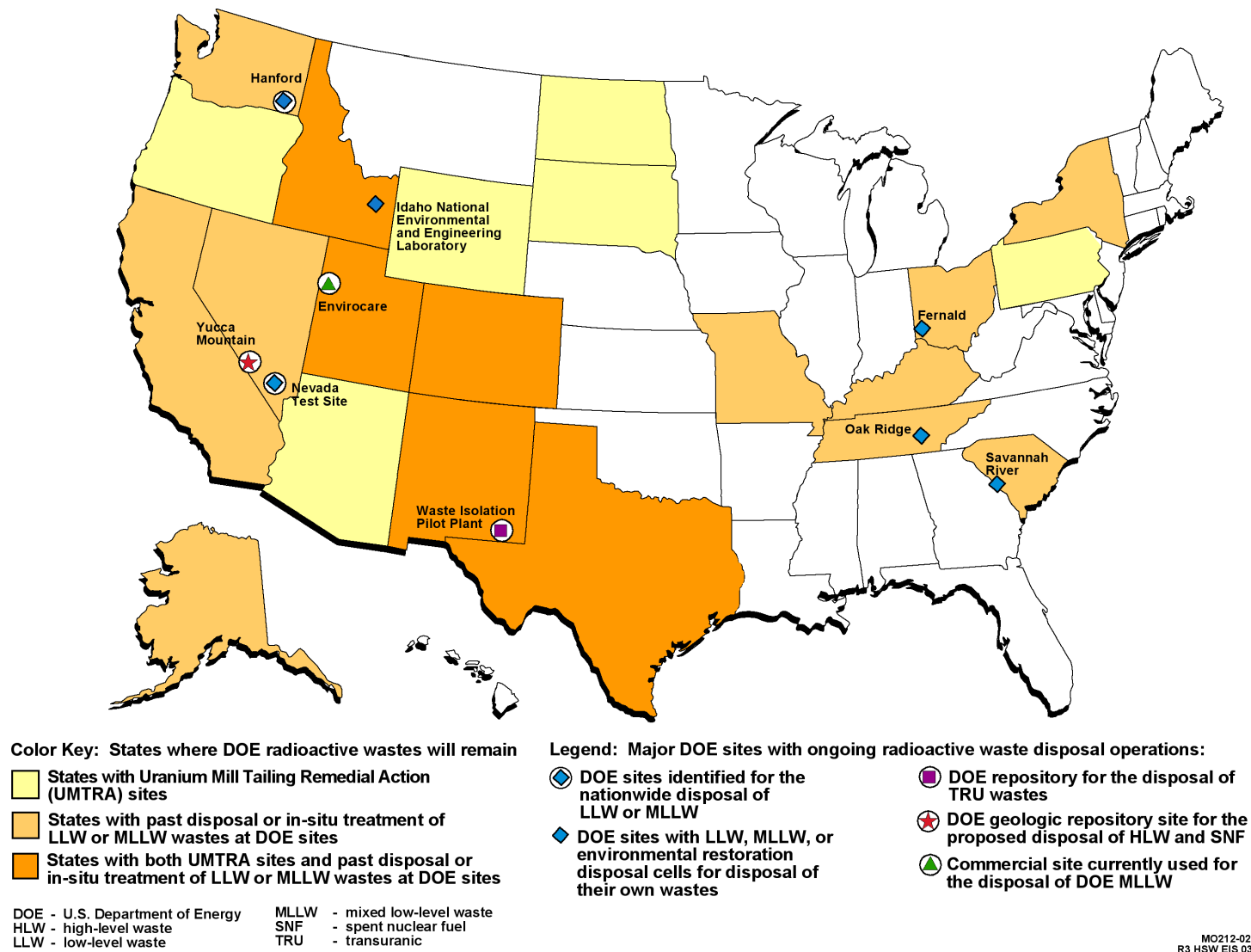


Figure S.3. States with Radioactive Waste Disposal Activities

## Hanford's Waste Management Plans

Hanford's waste management challenges are significant, but through the Hanford Performance Management Plan, this HSW EIS, and other decision documents, we are making progress. We have disposition plans for our waste types and materials, which are illustrated in Figure S.4 and discussed by waste type below. The text boxes in this section also highlight which waste types are analyzed in detail in this HSW EIS and which are not.

### What wastes are included in the HSW EIS and how are they defined?

**Low-level waste (LLW)** is radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, or byproduct material (as defined under the Atomic Energy Act of 1954) or naturally occurring radioactive material. LLW is technically defined by what it is not, and has a wide range of forms, concentrations, and hazards. LLW can range from very low to very high concentrations, but is generally the kind of waste acceptable for shallow-land disposal.

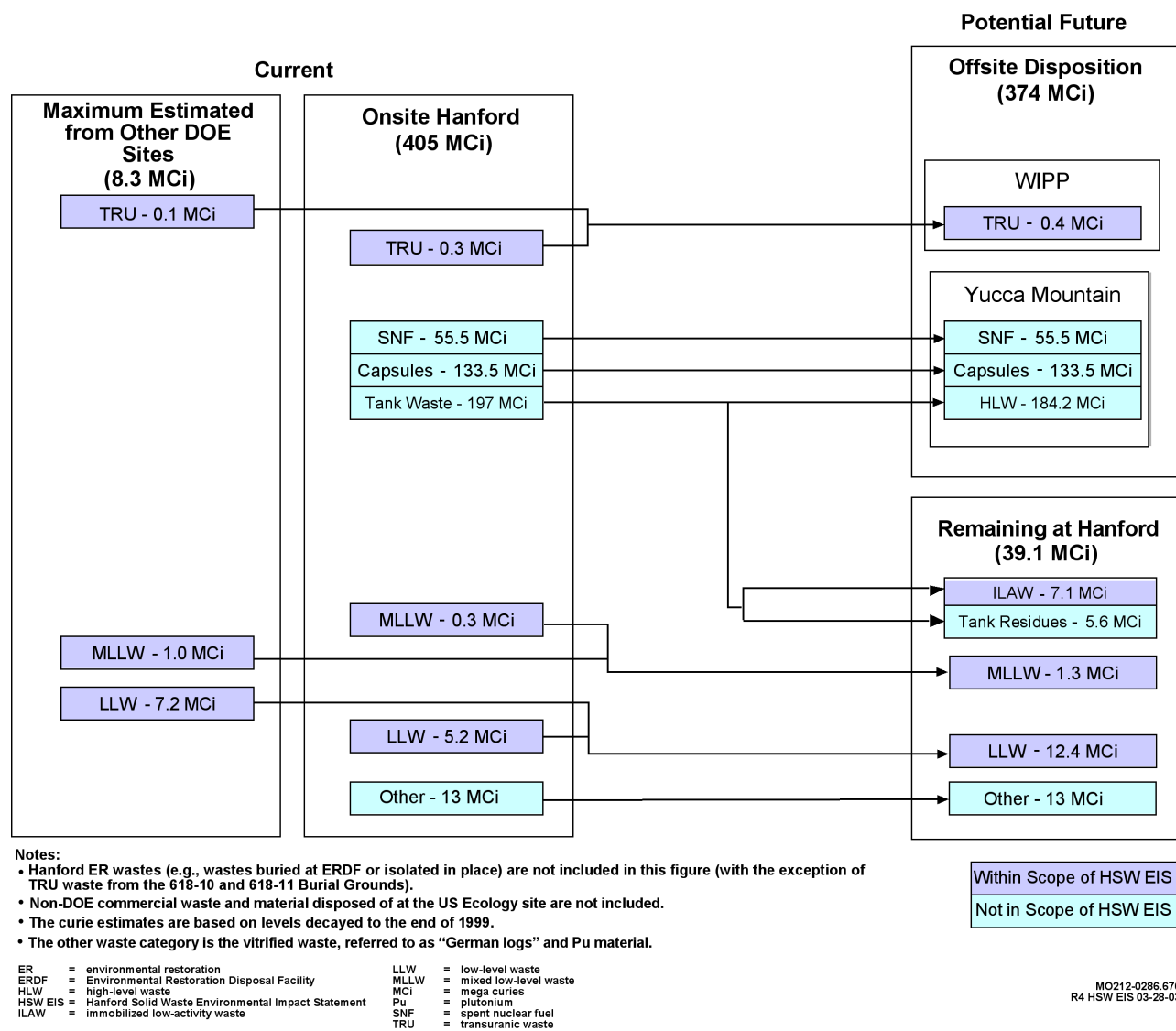
**Mixed low-level waste (MLLW)** is LLW that contains both radionuclides subject to the Atomic Energy Act of 1954, and a hazardous component subject to the Resource Conservation and Recovery Act (RCRA) and applicable Washington State Dangerous Waste Regulations.

**Immobilized low-activity waste (ILAW)** is the solidified low-activity waste from the treatment and immobilization of Hanford tank wastes. Low-activity waste is the waste that remains after separating from high-level waste (HLW) as much of the radioactivity as practicable, and that when solidified may be disposed of as low-activity waste in a near-surface facility in accordance with DOE requirements (DOE 2001b). The ILAW will be disposed of on the Hanford Site or at a qualified offsite facility. The HLW will be vitrified and poured into canisters for interim storage and eventual shipment to a national geologic repository.

**Transuranic (TRU) waste** is radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for the following:

- high-level radioactive waste
- waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations
- waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61 (DOE 2001c).

**High-Level Waste, Spent Nuclear Fuel, and Other Nuclear Materials:** We plan to send DOE HLW and spent nuclear fuel to a deep geologic repository, which has been approved by Congress for development at Yucca Mountain in Nevada, and which, under current DOE plans, subject to Nuclear Regulatory Commission licensing, would begin accepting waste in 2010. Our useable uranium has already been shipped to the Portsmouth Site in Ohio.



**Figure S.4. Waste and Materials Coming to and Leaving Hanford (in megacuries)**

1       **Transuranic Waste:** TRU waste from DOE sites across the nation is going to the Waste Isolation  
2 Pilot Plant in New Mexico, an underground repository that opened in 1999. The Hanford Site, Idaho  
3 National Engineering and Environmental Laboratory, Savannah River Site, Los Alamos National  
4 Laboratory, and Rocky Flats Environmental Technology Center (in Colorado) have begun shipping to  
5 the Waste Isolation Pilot Plant.

6  
7       Hanford has also received some TRU waste  
8 from other DOE sites that needed to take advantage of our existing and planned certification and  
9 storage capabilities. However, all TRU waste sent  
10 to Hanford will eventually be shipped to the Waste  
11 Isolation Pilot Plant. Our planned shipments from  
12 Hanford to the Waste Isolation Pilot Plant include  
13 the following:

- 14       • TRU waste currently stored in the Central  
15       Waste Complex
- 16       • TRU waste generated as a result of decom-  
17       missioning and demolition of facilities such  
18       as the Plutonium Finishing Plant
- 19       • sludge from the K Basins
- 20       • retrievably stored TRU waste currently located in the Low Level Burial Grounds
- 21       • TRU waste currently buried in the 618-10 and 618-11 Burial Grounds
- 22       • TRU waste sent to Hanford from other DOE sites to take advantage of existing and planned  
23       certification storage capabilities prior to transshipment to the Waste Isolation Pilot Plant
- 24       • TRU waste retrieved as a result of CERCLA remediation decisions.

25       **Low-Level and Mixed Low-Level Waste:** We plan to do the following with these waste types:

- 26       • Continue to dispose of our own LLW and MLLW onsite.
- 27       • For the waste generated by environmental restoration activities (e.g., contaminated soils and building  
28       demolition debris), continue to dispose of these wastes in a specially designed Environmental  
29       Restoration Disposal Facility.
- 30       • Accept some DOE LLW and MLLW from sites that do not have disposal capability. The Nevada  
31       Test Site and commercial disposal facilities such as Envirocare in Utah would also receive such  
32       waste.

**What waste types are not included in the  
analysis of HSW EIS alternatives?\***

- High-level radioactive waste
- Most liquid wastes
- Spent nuclear fuel
- Naval reactor compartments
- Non-radioactive hazardous wastes
- Most environmental restoration wastes generated as part of the CERCLA process
- Commercial LLW destined for US Ecology

\*While these wastes are not considered in the detailed alternative analysis, they are considered in the cumulative impacts analyses.

1 The scope of the HSW EIS does not include commercial LLW disposed of on land we lease to the  
2 State of Washington. The State permits US Ecology to operate a low-level waste burial ground for  
3 commercial waste on Hanford's Central Plateau. This operation is independent of our DOE cleanup and  
4 waste management operations at Hanford. However, we do consider the US Ecology facility in the  
5 cumulative impacts analysis in this EIS.  
6

7 Figure S.5 provides an overview of Hanford's waste and material disposal paths. It provides  
8 references to the existing NEPA documentation associated with each waste stream or source, including  
9 this HSW EIS.  
10

### 11 **S.3 Development of the Revised Draft HSW EIS**

12  
13 Last year, we issued our first draft of the HSW EIS for public comment. During the public comment  
14 period, we received a large number of comments (approximately 3,800) from tribal governments,  
15 regulators, stakeholders, and the public. Comments focused predominantly on the following:  
16

- 17 • importation of waste to the Hanford Site from offsite locations and the impact that waste would have  
18 on the environment
- 19
- 20 • how Hanford cleanup plans are affected by this EIS
- 21
- 22 • disposal facility design and long-term performance: there were numerous concerns regarding the use  
23 of unlined trenches for disposal of LLW, as well as concerns about contamination of groundwater  
24 and the Columbia River
- 25
- 26 • whether the document adequately analyzed the cumulative impacts of waste coming from offsite  
27 along with the wastes that are already here
- 28
- 29 • scope of transportation analysis: comments questioned the appropriateness of the WM PEIS  
30 transportation analysis and the decision not to repeat that nationwide analysis in the HSW EIS  
31
- 32 • technical content and scope of the HSW EIS: comments 1) pointed out perceived omissions or  
33 inaccuracies in the HSW EIS technical analyses alternatives and scope of the EIS, and 2) requested  
34 evaluation of additional alternatives for waste treatment and disposal, including alternative disposal  
35 facility designs
- 36
- 37 • why all other waste types at Hanford were not specifically analyzed, including disposal of the ILAW  
38 stream.  
39

40 We have prepared a revised draft of the HSW EIS to address these comments and give the public the  
41 information needed to better understand the decisions we need to make. This draft incorporates substan-  
42 tial changes that respond to the concerns we heard. Key changes included the following:  
43

- 44 • expanding the range and depth of alternatives and supporting analyses to include ILAW disposal  
45 alternatives  
46